

4 that of intersex, and sterna 5-6 as in female, in addition to a projecting sting, as in female, provide a typical appearance to the bee. Externally there is no evidence of male genital armature.

Material Examined: One gynandromorph, Kangra (H.P.), June 5, 1992, Coll. S. Simlote; Flower Record: *Helianthus annuus* (Sunflower) will be placed at Desert Research Station,

Zoological Survey of India, Jodhpur. (Expedition financed by ICAR Scheme No. 1-3/90 PP).

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29. BUTTERFLIES ATTRACTED TO LIGHT NEAR GOVERNMENT COLLEGE CAMPUS, VATAKARA, KERALA

Many insects are known to be attracted to light. Moths are highly attracted to light. Sometimes butterflies too are attracted to light.

Usman (1956) recorded Red Pierrot *Talicauda nyseus* (Lepidoptera: Lycaenidae) attracted to light at Bangalore. Shull and Nadkerny (1967) have reported five species of Family Satyridae and four species of Nymphalidae from Surat Dangs, Gujarat. Sharma and Chaturvedi (1999) recorded Black Rajah *Charaxes fabius* attracted to light at Tadoba National Park. Recently, Nair (2001) recorded Gram Blue *Euchrysops cnejus*, Tiny Grass Blue *Zizula hylax* (both Lycaenidae) and Nigger *Orsoerioena medus* (Satyrinae) attracted to light at Aralam Wildlife Sanctuary, Kerala. The present paper reports attraction of butterflies at the No: 3 /IV Staff quarters near the Government College Campus, Madappally, Kerala.

The site is situated on a small hill (50 m above msl) towards the north-west end of Kozhikode district near the Malabar Coast (11° 38' N; 75° 39' E) in Kerala and is 55 km from Kozhikode city. On the night of November 20, 2001, while collecting some insects attracted to a 60W incandescent bulb, at the verandah of the staff quarters at around 2030 hrs, I saw a butterfly flying and resting intermittently, around the light source. It was identified as the male Common Palmfly *Elymnias hypermnestra* (Linnaeus) (Nymphalidae: Satyrinae). Its

movements and orientation at light was quite similar to that during diurnal hours. No dashing at light was observed.

On June 15, 2002, I saw another butterfly attracted to the light at the same site around 2130 hrs; it was raining lightly then. This time it was a male Great Eggfly *Hypolimnas bolina* (Linnaeus) (Nymphalidae: Nymphalinae). The butterfly showed movements similar to that during diurnal hours. No dashing towards the light source occurred.

Both these butterflies were unusual visitors to light. These records contradict the popular idea that butterfly activity is exclusively diurnal. More studies in this regard will reveal the secrets of this interesting phenomenon.

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30. CLADOCERAN COMPOSITION OF ADRA LAKE, WEST BENGAL

Adra lake (also known as Saheb Bund) is a relatively small water body (c. 2.5 sq. km), situated c. 5 km away from

the Adra town, in the Purulia district of West Bengal (23° 42' N and 87° 01' E). The lake water is quite clean and forms the

Table 1: Systematic account of Cladoceran fauna of Adra Lake

Scientific Name	Material Examined	Description	Distribution
Family Sididae Baird 1850			
1. <i>Diaphanosoma excism</i> Sars 1885	L: 0.36, W: 0.2 mm; F	Head large, without rostrum, carapace almost oblong in outline, postero-dorsal corner of valves almost ending in right angle, eyes relatively large, with numerous crystalline lenses, located in front portion of the head, post abdomen narrow with fine setules, claw with three basal spines	West Bengal, Rajasthan and Bihar. Elsewhere in tropics and subtropics
Family Moinidae Goulden 1968			
2. <i>Moina brachiata</i> (Jurine 1820)	L: 0.36, W: 0.29 mm; F	Head depressed, supra-ocular depression not well marked. Antennules cigarette shaped, long with setae arranged in rings. Valves oblong ending bluntly posteriorly, post abdomen large, well defined and claw with large pecten of 11-14 teeth	Kashmir, Rajasthan, Meghalaya
Family Bosminidae Sars 1865			
3. <i>Bosmina longirostris</i> (O.F. Muller 1776)	L: 0.27, W: 0.17 mm; F	Body almost oval in outline; postero-dorsal corner of valves distinctly angular, postero-ventral corner produced into backwardly directed spine (mucro). Head large, slightly arched in front of the eye. Antennules almost parallel to each other, curved backward; claw with proximal pecten of 3-6 spinules	Kashmir, Meghalaya, and West Bengal. Elsewhere Cosmopolitan
Family Macrothricidae Norman & Brady 1867			
4. <i>Macrothrix spinosa</i> King 1853	L: 0.38, W: 0.21 mm; F	Carapace rounded oval in outline, dorsal margin almost evenly arched, ventral margin subangulated in middle and obliquely ascending posterior end with well marked short protuberance, head moderately large and sub-triangular, antennules enlarged at apex, ventral edge of valves separate and armed with slender spine, post abdomen short, bilobed and with a row of small anal denticles	Rajasthan, Manipur. Elsewhere-Cosmopolitan
5. <i>Macrothrix laticornis</i> (Jurine 1820)	L: 0.27, W: 0.15 mm; F	Body small, oval, with a small protuberance at its posterior end; valves with serrations on the dorsal edge distinct only in postero-dorsal edge distinct only in postero-dorsal region. Head evenly arched. Antennules broadening apically with distinct ventral articulation. Eye very near to the margin of the head; postabdomen broad with fine spines and setules	Ladakh and Nilgiri Hills
6. <i>Echinisca triserialis</i> (Brady 1886)	L: 0.3, W: 0.24 mm; F	Body roughly oval in shape; ventral margin is more arched than dorsal, with sharp protuberance in between. Serrations and bristles throughout on ventral margin but dorsum at its posterior side only. Antennule slender and cylindrical; postabdomen averagely broad, with anal spines on the both the lobes	West Bengal and Rajasthan. Elsewhere-Cosmopolitan

Table 1: Systematic account of Cladoceran fauna of Adra Lake (contd.)

Scientific Name	Material Examined	Description	Distribution
Family Chydoridae Stebbing 1902			
Subfamily Chydorinae Stebbing 1902			
7. <i>Chydorus sphaericus</i> (O.F. Muller 1776)	L: 0.21, W: 0.18 mm; F	Body spherical in outline, length slightly more than height; valves with distinct postero-dorsal corner, postero-ventral corner rounded, without denticles; valves with pentagonal reticulations; rostrum pointed; post abdomen short with 7-10 anal denticles; preanal corner projection.	West Bengal, Bihar, Kashmir, Ladakh, Nilgiri hills and Meghalaya. Elsewhere-Cosmopolitan
8. <i>Chydorus parvus</i> (Daday 1898)	L: 0.12, W: 0.19 mm; F	Valves oval, corners distinct, tubercles present on the inner side of anterior margin of valves without denticles, antennules reaching apex of rostrum, antennules tapering at distal ends, post abdomen strongly projection anal denticles 9-10	West Bengal
9. <i>Chydorus barroisi</i> Richard 1894b	L: 0.32, W: 0.3 mm; F	Body elliptical; dorsal and ventral margins convex, postero-dorsal corner of valves rounded; rostrum with apical notch; antennules short and conical; post abdomen short, with 9 unequal unispines.	West Bengal and Gujarat. Elsewhere-Cosmopolitan
Subfamily Aloninae Frey 1967			
10. <i>Alona quadrangularis</i> (O.F. Muller 1776)	L: 0.28, W: 19 mm; F	Body almost rectangular with maximum height at its posterior end. Postero-dorsal and postero-ventral valves rounded; longitudinal and transverse cells of valves forming cells; head shield with pointed posterior margin; plate of labrum convex; post abdomen broadened distally, with 14-16 anal spines	West Bengal and South India
11. <i>Alona rectangula rectangula</i> Sars 1862a	L: 0.3, W: 0.18 mm; F	Body sub-quadrate, postero-dorsal and postero-ventral corners of valves rounded with longitudinal lines, post abdomen with 7 anal spines accompanied by setae, claw with basal spines	Ladakh, Gujarat, Rajasthan, Kashmir, Meghalaya and West Bengal
12. <i>Alona rectangula richardi</i> (Stingelin 1895)	L: 0.24, W: 0.14 mm; F	Postero-ventral corner of the valves rounded and with longitudinal lines, antennules almost reaching apex of rostrum, post abdomen slightly widening distally, with 6-9 lateral groups of setae	West Bengal
13. <i>Acroperus harpae</i> (Baird 1834)	L: 0.27, W: 0.17 mm; F	Body small, oval, strongly compressed laterally; postero-ventral corner of the valves with 2-5 denticles; antennules reaching apex of the rostrum; postabdomen slightly tapering distally, claw with basal spine	Kashmir and West Bengal

L: Length, W: Width, F: Female

main source of drinking water for the people living around. In spite of being around for c. 60 years, no attempt has been made to study its faunal composition, though several endeavours have been carried out in West Bengal. Cladocerans are one of the indicators for the status of water quality. As this is the only drinking water source for this railway town, the author thought that it was necessary to identify its Cladoceran fauna.

Out of the 109 species of Cladocera reported from India, 41 species were reported from West Bengal (ZSI 1991). The present study is significant, as it is the first attempt to analyse the ecosystem of Adra lake. 13 species belonging to 8 genera from five families were identified in this study (Table 1).

Plankton was collected using a diving plankton net (No. 25), with a 50 ml plastic container tied at its end, from the sub-surface of this small water body during limnological studies in October, 1995 and February, 1996. Samples were preserved in 4% formaldehyde solution. Cladoceran fauna was identified with the aid of standard keys (Michael and Sharma 1988, Battish 1992).

During the study period, the cladocerans were dominant over the other zooplankton groups. They were mostly

abundant and diverse during winter. Out of the 13 cladoceran species, *Diaphanosoma excism* and *Macrothrix spinosa* are most dominant, followed by *Moina brachiata* and *Bosmina longirostris*. The rest were representative.

According to Das (1989), presence of *Chydorus sphaericus*, *Simocephalus* and *Bosmina* spp. (of the lake cladoceran composition) indicates an Oligotrophic lake and *Diaphanosoma* indicates a Eutrophic lake. The cladoceran parameters in this case indicate that this water body is becoming Mesotrophic and the lake water cannot be directly used as drinking water. Some filtering units are situated in the vicinity of the system for increasing the potability of water. Concerned authorities should prevent the eutrophication of this ecosystem, resulting from anthropogenic activities in the lake environs.

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31. SOME OBSERVATIONS ON TWO RARE ENDEMIC DIPTEROCARPS OF SOUTHERN WESTERN GHATS

Dipterocarpus bourdilloni Brandis

Vernacular name: Malayalam: Karanjili, Charatanjali;
Tamil: Karanjil

Distribution: *Dipterocarpus bourdilloni* is a rare endemic tree (one of the majestic dipterocarps), which usually occurs along riverbanks in the West Coast Tropical Evergreen forests up to 600 m altitude. Interestingly, this species shows comparatively narrow and staggered distribution and is mainly confined to the northern part of Kerala (Ramesh *et al.* 1996). We found some isolated patches near Mukkali (near Silent Valley, Palakkad district), Carcoorghat (Cannanore district) and Uppangal on the lower slopes of Coorg. It also occurs in Kallar valley, Damalayar, Pooyamkutty, Achankoil and Mandampatty in Kerala.

Floristics: Some of the associate species of *Dipterocarpus bourdilloni* are *Actinodaphne hirsuta*, *Antidesma* spp., *Artocarpus hirsuta*, *Bischofia javanica*,

Dipterocarpus indicus, *Hopea parviflora*, *Hydnocarpus* spp., *Knema attenuata*, *Macaranga peltata* and *Mesua ferrea* among others. It is a large evergreen tree attaining height up to 30-40 m and girth 4-5 m, with clear straight and cylindrical bole of 20-25 m. In lowland evergreen forests of Western Ghats, it is invariably the indicator of main strata. The classification of low elevation evergreen forests of the Western Ghats is based mainly on the distribution of *Dipterocarpus bourdilloni* and *Dipterocarpus indicus* (Pascal 1988). They are often found in mixture with other trees. Buttresses are absent although the trees are large, whether this is compensated by deep rooting is not known. Branching is generally confined to the uppermost part of the trunk and appears like a flattened umbrella. Branches are orthotropic in nature. There are no side branches up to a certain height.

Bark dark brown, thick, outer bark exfoliates in irregular flakes. Leaves up to 40 cm x 20 cm, elliptic, oblong, lateral